

What is claimed is:

1. A three-dimensional measuring equipment, comprising of a three-dimensional data acquisition device for measuring the three-dimensional surface shape of an object and a three-dimensional data processing device for generating three-dimensional data based on the measuring result, said three-dimensional data acquisition device comprising:

a plurality of light sources each provided at a given position in a space, for projecting a stripe pattern onto said object;

a plurality of measuring cameras each provided at a given position in said space for capturing the stripe pattern projected onto said object and for detecting a part or all of the position, inclination, direction of light axis, magnification of the camera within said space,

said three-dimensional data processing device comprising:

controller means for directing said measuring cameras to obtain a part or all of parameters of the position, inclination, direction of light axis, magnification of said measuring cameras within said space, for obtaining said parameters from said measuring cameras, for extracting the combinations of said light source for projecting the stripe pattern to said object and said measuring camera for capturing said stripe pattern based on said parameters, for performing control of sequential order and measuring time of said measuring cameras for capturing, and for capturing the stripe pattern of said object by means of said measuring cameras, to thereby obtain the measuring data;

three-dimensional data calculating means for

generating three-dimensional data based on said measuring data;

data processing means for performing three-dimensional display of said object based on said three-dimensional data; and

storage means for storing said three-dimensional data generated.

2. A three-dimensional measuring equipment comprising of a three-dimensional data acquisition device for measuring the three-dimensional surface shape of an object and a three-dimensional data processing device for generating three-dimensional data based on the measuring result,

said three-dimensional data acquisition device comprising:

a plurality of light sources each provided at a given position in a space, for projecting a stripe pattern onto said object;

a plurality of measuring cameras each provided at a given position in said space, for capturing the stripe pattern projected onto said object; and

at least one or more measuring camera position measuring sensors each provided at a given position in said space, for detecting a part or all of the position, inclination, direction of light axis, magnification of said measuring cameras in said space,

said three-dimensional data processing device comprising:

controller means for directing said measuring camera position measuring sensors to obtain a part or all of parameters of the position, inclination, direction of light axis, and magnification of said measuring cameras in said

space, for obtaining said parameters from said measuring camera position measuring sensors, for extracting the combination of said light source for projecting the stripe pattern onto said object and said measuring camera for capturing said stripe pattern, for performing the control of sequential order and measuring time of said measuring cameras for capturing, and for capturing the stripe pattern of said object by means of said measuring cameras, to thereby obtain the measuring data;

three-dimensional data calculating means for generating three-dimensional data based on said measuring data;

data processing means for performing three-dimensional display of said object based on said three-dimensional data; and

storage means for storing said three-dimensional data generated.

3. A three-dimensional measuring equipment comprising a three-dimensional data acquisition device for measuring the three-dimensional surface shape of an object and a three-dimensional data processing device for generating three-dimensional data based on the measuring result,

said three-dimensional data acquisition device comprising:

at least one or more object position measuring sensors each provided at a given position in a space for detecting the position of said object in said space;

a plurality of light sources each provided at a given position in a space, for projecting a stripe pattern onto said object; and

a plurality of measuring cameras each provided at a

given position in said space, for capturing said stripe pattern projected to said object and for detecting a part or all of parameters of the position, inclination, direction of light axis, and magnification of the camera in said space, said three-dimensional data processing device comprising:

controller means for directing said object position measuring sensor and said measuring cameras to obtain a part or all of the parameters of the position of said object in said space, the position, inclination, direction of light axis, magnification of said measuring camera in said space, for obtaining said parameters from said object position measuring sensors and said measuring cameras, for extracting the combination of the light source projecting the stripe pattern onto said object and said measuring camera capturing said stripe pattern based on said parameters, for performing the control of sequential order and measuring time of capturing said measuring cameras for capturing, and for capturing the stripe pattern of said object by means of said measuring cameras, to thereby obtain the measuring data;

three-dimensional data calculating means for generating three-dimensional data based on said measuring data;

data processing means for performing three-dimensional display of said object based on said three-dimensional data; and

storage means for storing said three-dimensional data generated.

4. A three-dimensional measuring equipment comprising a three-dimensional data acquisition device for measuring the three-dimensional surface shape of an object and a

three-dimensional data processing device for generating three-dimensional data based on the measuring result,

said three-dimensional data acquisition device comprising:

at least one or more object position measuring sensors each provided at a given position in a space, for detecting the position of said object in said space;

a plurality of light sources each provided at a given position in said space, for projecting a stripe pattern onto said object;

a plurality of measuring cameras each provided at a given position in said space, for capturing the stripe pattern projected onto said object; and

at least one or more measuring camera position measuring sensors each provided at a given position in said space, for detecting a part or all of the parameters of the position, inclination, direction of light axis, magnification of said measuring cameras in said space,

said three-dimensional data processing device comprising:

controller means for directing said object position measuring sensors and said measuring camera position measuring sensors to obtain a part or all of the parameters of the position of said object in said space, and the position, inclination, direction of light axis, magnification of said measuring cameras in said space, for obtaining said parameters from said object position measuring sensors and said measuring camera position measuring sensors, for extracting the combination of said light source projecting the stripe pattern onto said object and said measuring camera capturing said stripe pattern based on said parameters, for performing the control of sequential order and measuring time of capturing

said measuring cameras for capturing, and for capturing the stripe pattern of said object by said measuring camera, to thereby obtain measuring data;

three-dimensional data calculating means for generating three-dimensional data based on said measuring data;

data processing means for performing three-dimensional display of said object based on said three-dimensional data; and

storage means for storing said three-dimensional data generated.

5. A three-dimensional measuring equipment in accordance with claim 3 or claim 4, wherein

the measuring camera moves under the control of the controller means based on the position of the object detected by the object position measuring sensors, for capturing the stripe pattern.

6. A three-dimensional measuring equipment in accordance with any one of claims 3 to 5, wherein

said measuring camera alters the inclination, direction of light axis, and magnification under the control of said controller means based on the position of said object detected by said object position measuring sensors for capturing said stripe pattern.

7. A three-dimensional measuring equipment in accordance with any one of claims 1 to 6, wherein

the three-dimensional data calculating means performs the conversion of point-group data, rotation and translation after conversion, synthesizing and smoothing, based on said

measuring data, for generating three-dimensional data.

8. A three-dimensional measuring equipment in accordance with any one of claims 1 to 7, wherein

when the controller means extracts the combination of said light source and said measuring camera, it extracts a combination such that the stripe patterns projected by said light source do not overlap with each other on the object.

9. A three-dimensional measuring equipment in accordance with any one of claims 1 to 7, wherein

when extracting the combination of the light source and the measuring camera,

if the measuring camera has a lens or filter that blocks the light of a specific frequency or a color filter that blocks a specific color,

the controller means extracts appropriately a combination of the light source and the measuring camera.

10. A three-dimensional measuring equipment in accordance with any one of claims 1 to 9, wherein

the measuring camera has a lens or filter that extracts a specific phase,

the controller means controls, in a time-division manner, switching on and off the function of said lens or filter that extracts a specific phase.

11. A three-dimensional measuring equipment in accordance with any one of claims 1 to 10, wherein

the controller means performs the control of the measuring cameras based on the color information contained in the measuring data.

12. A three-dimensional data acquisition device for performing the measurement of the three-dimensional surface shape of an object under the control of a three-dimensional data processing device, for generating three-dimensional data,

said three-dimensional data acquisition device comprising:

a plurality of light sources each provided at a given position in a space, for projecting a stripe pattern onto said object;

a plurality of measuring cameras each provided at a given position in said space, for capturing the stripe pattern projected onto said object and for detecting a part or all of the parameters of the position, inclination, direction of light axis, magnification of the camera in said space.

13. A three-dimensional data acquisition device for performing the measurement of the three-dimensional surface shape of an object under the control of a three-dimensional data processing device, for generating three-dimensional data,

said three-dimensional data acquisition device comprising:

a plurality of light sources each provided at a given position in a space, for projecting a stripe pattern onto said object;

a plurality of measuring cameras each provided at a given position in said space, for capturing the stripe pattern projected onto said object;

at least one or more measuring camera position measuring sensors each provided at a given position in said space, for



detecting a part or all of the parameters of the position, inclination, direction of light axis, magnification of said measuring camera in said space.

14. A three-dimensional data acquisition device for performing the measurement of the three-dimensional surface shape of an object under the control of a three-dimensional data processing device, for generating three-dimensional data, comprising:

- at least one or more object position measuring sensors each provided at a given position in a space, for detecting the position of said object in said space,

- a plurality of light sources each provided at a given position in said space, for projecting a stripe pattern onto said object;

- a plurality of measuring cameras each provided at a given position in said space, for capturing the stripe pattern projected onto said object and for detecting a part or all of the parameters of the position, inclination, direction of light axis, magnification of the camera in said space.

15. A three-dimensional data acquisition device for performing the measurement of the three-dimensional surface shape of an object under the control of a three-dimensional data processing device, for generating three-dimensional data, comprising:

- at least one or more object position measuring sensors each provided at a given position in a space, for detecting the position of said object in said space;

- a plurality of light sources each provided at a given position in said space, for projecting a stripe pattern onto said object;

a plurality of measuring cameras each provided at a given position in said space, for capturing the stripe pattern projected onto said object; and

at least one or more measuring camera position measuring sensors each provided at a given position in said space, for detecting a part or all of the parameters of the position, inclination, direction of light axis, magnification of said measuring camera in said space.

16. A three-dimensional data acquisition device in accordance with claim 14 or claim 15, wherein

the measuring camera moves under the control of the controller means based on the position of the object detected by the object position measuring sensor, to thereby capture the stripe pattern.

17. A three-dimensional data acquisition device in accordance with any one of claims 14 to 16, wherein

the measuring camera alters its inclination, direction of light axis, and magnification under the control of the controller means based on the position of the object detected by said object position measuring sensor, to thereby capture the stripe pattern.

18. A three-dimensional data processing device for generating three-dimensional data based on the result obtained from a three-dimensional data acquisition device for capturing the three-dimensional surface shape of an object,

said three-dimensional data processing device comprising:

controller means for directing a plurality of measuring cameras each provided at a given position in a space of said

three-dimensional data acquisition device for capturing the stripe pattern of said object projected by a plurality of light sources each provided at a given position in said space of said three-dimensional data acquisition device for projecting the stripe pattern onto said object, and for detecting a part or all of the parameters of its position, inclination, direction of light axis, magnification in said space to obtain a part or all of the parameters of the position, inclination, direction of light axis, magnification of said measuring cameras in said space, for obtaining said parameters from said measuring cameras, for extracting the combination of the light source projecting the stripe pattern onto said object and said measuring camera capturing said stripe pattern, based on said parameters, for performing the control of sequential order and measuring time of said measuring cameras for capturing, and for capturing the stripe pattern of said object by means of said measuring cameras, to thereby obtain measuring data;

three-dimensional data calculating means for generating three-dimensional data based on said measuring data;

data processing means for performing three-dimensional display of said object based on said three-dimensional data; and

storage means for storing said three-dimensional data generated.

19. A three-dimensional data processing device for generating three-dimensional data based on the result obtained from a three-dimensional data acquisition device for capturing the three-dimensional surface shape of an object,

said three-dimensional data processing device comprising:

controller means for directing measuring camera measuring position sensors for detecting a part or all of parameters of the position, inclination, direction of light axis, magnification, in a space of said three-dimensional data acquisition device, of a plurality of measuring cameras each provided at a given position in said space of said three-dimensional data acquisition device for capturing the stripe pattern of said object projected thereon by a plurality of light sources each provided at a given position in said space of said three-dimensional data acquisition device for projecting the stripe pattern onto said object to obtain a part or all of the parameters of the position, inclination, direction of light axis, magnification of said measuring cameras in said space, for obtaining said parameters from said measuring camera measuring position sensors, for extracting the combination of the light source projecting the stripe pattern onto said object and said measuring camera capturing said stripe pattern based on said parameters, for performing the control of sequential order and measuring time of said measuring cameras for capturing, and for capturing the stripe pattern of said object by means of said measuring cameras, to thereby obtain measuring data;

three-dimensional data calculating means for generating three-dimensional data based on said measuring data;

data processing means for performing three-dimensional display of said object based on said three-dimensional data; and

storage means for storing said three-dimensional data generated.

20. A three-dimensional data processing device for

generating three-dimensional data based on the result obtained from a three-dimensional data acquisition device for capturing the three-dimensional surface shape of an object, said three-dimensional data processing device comprising:

controller means for directing at least one or more object position measuring sensors each provided at a given position in a space of said three-dimensional data acquisition device for detecting the position of said object and a plurality of measuring cameras each provided at a given position in said space of said three-dimensional data acquisition device for capturing the stripe pattern of said object projected by a plurality of light sources each provided at a given position in said space of said three-dimensional data acquisition device for projecting the stripe pattern onto said object and for detecting a part or all of the parameters of its position, inclination, direction of light axis, magnification in said space to obtain part or all of the parameters of the position of said object in said space, and the position, inclination, direction of light axis, magnification of said measuring cameras in said space, for obtaining said parameters from said object position measuring sensors and said measuring cameras, for extracting the combination of the light source projecting the stripe pattern onto said object and said measuring camera capturing said stripe pattern based on said parameters, for performing the control of sequential order and measuring time of said measuring cameras for capturing, and for capturing the stripe pattern of said object by means of said measuring cameras, to thereby obtain said measuring data;

three-dimensional data calculating means for generating three-dimensional data based on said measuring

data;

data processing means for performing three-dimensional display of said object based on said three-dimensional data; and

storage means for storing said three-dimensional data generated.

21. A three-dimensional data processing device for generating three-dimensional data based on the result obtained from a three-dimensional data acquisition device for capturing the image of the three-dimensional surface shape of an object,

said three-dimensional data processing device comprising:

controller means for directing at least one or more object position measuring sensors each provided at a given position in a space of said three-dimensional data acquisition device for detecting the position of said object and a plurality of measuring camera measuring position sensors each provided at a given position in said space of said three-dimensional data acquisition device for detecting a part or all of the parameters of the position, inclination, direction of light axis, magnification, in said space of said three-dimensional data acquisition device, of a plurality of measuring cameras each provided at a given position in said space of said three-dimensional data acquisition device for capturing the stripe pattern of said object projected by a plurality of light sources each provided at a given position in said space of said three-dimensional data acquisition device for projecting the stripe pattern onto said object to obtain a part or all of the parameters of the position of said object in said space and the position, inclination, direction

of light axis, magnification of said measuring cameras in said space, for obtaining said parameters from said object position measuring sensors and said measuring camera measuring position sensors, for extracting the combination of the light source projecting the stripe pattern onto said object and said measuring camera capturing said stripe pattern based on said parameters, for performing the control of the sequential order and measuring time of said measuring cameras for capturing, and for capturing the stripe pattern of said object by means of said measuring cameras to obtain measuring data;

three-dimensional data calculating means for generating three-dimensional data based on said measuring data;

data processing means for performing three-dimensional display of said object based on said three-dimensional data; and

storage means for storing said three-dimensional data generated.

22. A three-dimensional data processing device in accordance with any one of claims 18 to 21, wherein

the three-dimensional data calculating means performs the conversion of point-group data, rotation and translation after conversion, synthesizing and smoothing, based on said measuring data, for generating three-dimensional data.

23. A three-dimensional data processing device in accordance with any one of claims 18 to 22, wherein

when the controller means extracts the combination of said light source and said measuring camera, it extracts a combination such that the stripe patterns projected by the light source do not overlap with each other on the object.

24. A three-dimensional data processing device in accordance with any one of claims 18 to 22, wherein

when extracting the combination of the light source and the measuring camera,

if said measuring camera has a lens or filter that blocks the light of a specific frequency or a color filter that blocks a specific color,

the controller means extracts appropriately a combination of said light source and said measuring camera.

25. A three-dimensional data processing device in accordance with any one of claims 18 to 24, wherein

the measuring camera has a lens or filter that extracts a specific phase,

the controller means controls, in a time-division manner, switching on and off the function of said lens or filter that extracts a specific phase.

26. A three-dimensional data processing device in accordance with any one of claims 18 to 25, wherein

the controller means performs the control of the measuring cameras based on the color information contained in the measuring data.